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L5: Entry 1 of 39

File: USPT

Apr 23, 2002

DOCUMENT-IDENTIFIER: US 6375546 B1

TITLE: Method for forming synthetic turf games surface

Detailed Description Paragraph Right (4):

The material utilized for the underpad may be varied. That is, other resiliently compressible plastic materials may be used, such as rubber-like polyurethane or polyvinyl chloride or the like materials.

Detailed Description Paragraph Right (14):

As mentioned, the particular pile carpet construction may be varied. However, an example of a useful carpet for a golf green comprises synthetic grass of approximately 7600 deniers, an approximate density of 0.142 g/cm.sup.2, and a fiber height of approximately 16 mm combined with an underpad of 12 mm to 50 mm in thickness.

Detailed Description Paragraph Right (15):

Similarly, an example of a fairway portion of a golf course may be in the range of approximately 7600 deniers synthetic grass, an approximate density of 0.142 to 0.187 g/cm.sup.2, with a fiber height of about 16 to 50 mm with an underpad of at least about 25 mm thick.

Detailed Description Paragraph Right (16):

Still another example of the synthetic grass would be a weaving standard in the range of 3,600 to 10,000 deniers, with 13 to 22 stitches per 76 mm, 3/16 gage and a density of about 0.115 to 0.220 g/cm.sup.2.

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L5: Entry 2 of 39

File: USPT

Apr 16, 2002

DOCUMENT-IDENTIFIER: US 6372310 B1

TITLE: Combined and stabilized turf for an athletic field

Abstract Paragraph Left (1):

The invention relates to a base layer for a combined synthetic and natural turf comprising a fabric of which at least a part of the weft and/or warp threads is manufactured from a biodegradable material and/or is wholly absent so that the fabric contains apertures, and synthetic turf fibers which are least partially cowoven with the fabric and of which one or both ends form synthetic grass blades. These ends only protrude from the fabric at those locations where the non-degradable warp and weft threads intersect. The base layer is used in combined synthetic and natural turfs comprising a foundation, optionally a first layer of growth substrate and a base layer according to the invention which is provided with a second layer of growth substrate in which grass plants grow. The invention further relates to a method for laying a combined turf using the base layer of the invention.

Brief Summary Paragraph Right (3):

Synthetic grass surfaces have therefore already existed for a number of years, in particular for hockey, tennis and the like. Synthetic grass surfaces require less maintenance and withstand a more intensive use than natural turfs. However, the drawback of synthetic turf is that the frictional resistance is so high that wounds and/or injuries can be caused in the case of sliding tackles and undesired falls.

Brief Summary Paragraph Right (5):

Therefore a hybrid turf or combination turf has already been proposed in the above mentioned patent document WO-A-9400639, in which the advantages of both types of turf are combined. This combination turf is formed by a conventional synthetic grass surface constituting a base layer on which a layer of growth substrate is strewn. Grass seed is sown into this growth substrate, so that the crowns of the grass lay between the synthetic grass fibers and are protected thereby. The synthetic grass is formed by a backing and a great number of upright synthetic grass fibers connected therewith. The synthetic grass fibers are regularly spaced, and may be connected to the backing by tufting or weaving. The backing is perforated, so as to allow water and roots of the natural grass to pass therethrough. As backing a coarse woven material is for instance proposed, wherein apertures are formed between the warp and weft threads. It is further proposed to construct the backing from two layers, an apertured top layer carrying the synthetic fibers and a bottom layer stabilizing the top layer with the fibers and preventing the fibers from becoming unstuck during handling of the synthetic grass. The bottom layer may be made from a biodegradable material, so that this will gradually disappear after the turf has been laid, leaving only the perforated top layer with the synthetic grass fibers.

Brief Summary Paragraph Right (6):

In this known combination turf the emphasis is mainly on the synthetic grass, and there is relatively little room for growing a robust natural grass turf. Furthermore, the cost of the known combination turf is relatively high.

Brief Summary Paragraph Right (7):

It is therefore the object of the present invention to provide a combination turf comprising a relatively high percentage of natural grass and which may be constructed and laid for a relatively moderate cost. This is achieved according to the invention by making use for the combined synthetic and natural turf of a base layer as described above, in which the fiber ends forming the synthetic grass blades protrude from the fabric at location where the weft threads and the warp threads intersect. By forming the synthetic grass blades exclusively at the intersections of the warp and weft threads, and not at those locations where only warp threads or weft threads are

present, a base layer is obtained in which there is relatively much room for arranging natural grass. Furthermore, since the synthetic grass fibers protrude from the fabric at the intersections of warp and weft threads, the loads are transmitted to the base layer at those locations where this is strongest. It is preferable to have the synthetic grass fibers woven into the fabric, whereby a very strong connection is formed.

Brief Summary Paragraph Right (9):

The above-described base layer may be arranged between two layers of growth substrate, with grass being sown in the top layer. Due to the apertures, which are present from the start or are created in the course of time by decay or decomposition of the biodegradable threads, the roots of the natural grass plants have the opportunity to grow through the base layer and to become anchored in the bottom layer of growth substrate and possibly also at least partially in the base layer. Optimal rooting hereby becomes possible while the additional strength of the remaining fabric threads and synthetic grass blades is still retained.

Brief Summary Paragraph Right (11):

In particular, the present invention provides a base layer for a combined synthetic and natural turf, the base layer comprising: a fabric formed by a plurality of mutually substantially parallel warp threads and a plurality of mutually substantially parallel weft threads intersecting the warp threads, said fabric comprising a plurality of apertures, and a plurality of synthetic grass fibers connected at least partially to the fabric, at least one of the ends of each fiber protruding outside the fabric and forming a synthetic grass blade, characterized in that the apertures are formed by enlarged spaces between adjacent warp and/or weft threads, and the fiber ends forming the synthetic grass blades protrude from the fabric at location where the weft threads and the warp threads intersect. In another aspect, the invention provides such a base layer further characterized in that the synthetic grass fibers are woven into the fabric.

Brief Summary Paragraph Right (12):

In other embodiments, the invention provides such base layers further characterized in that the apertures are formed during use of the base layer by warp and/or weft threads made from a biodegradable material. In other embodiments, such base layers (further characterized in that the fabric is formed by a plurality of series of non-biodegradable weft threads and a plurality of series of biodegradable weft threads alternating with these series and a plurality of series of non-biodegradable warp threads intersecting the weft threads and a plurality of series of biodegradable warp threads alternating with these series, and in that the ends of the synthetic grass fibers protrude from the fabric at the intersections of these series of non-biodegradable warp threads and non-biodegradable weft threads) are provided by the invention. In related embodiments, the invention provides such base layers comprising biodegradable threads further characterized in that the biodegradable material is chosen from jute, sisal, coconut fiber, or biodegradable polymers.

Brief Summary Paragraph Right (13):

In another aspect, the invention provides such base layers further characterized in that the artificial grass fibers are monofilament fibers. In other related aspects, the invention provides such base layers further characterized in that at least part of the synthetic grass fibers has at least one colour other than green, which, in some embodiments, may be further characterized in that the synthetic grass fibers having different colours form a pattern like lines of a sportsfield or a club logo.

Brief Summary Paragraph Right (15):

In other embodiments, combined synthetic and natural turf, comprising a foundation, a base layer (noted previously as being provided by the invention) arranged thereon, and a layer of growth substrate in which grass plants may grow arranged on the base layer, is provided by the invention. In related embodiments, the invention provides such combined synthetic and natural turf further characterized in that the thickness of the layer of growth substrate on the base layer is chosen such that the synthetic grass blades of the base layer protrude thereabove. In related embodiments, the invention provides such combined synthetic and natural turf (the thickness of the layer of growth substrate on the base layer being chosen such that the synthetic grass blades of the base layer protrude, or do not protrude, thereabove) further characterized by a layer of growth substrate arranged between the foundation and the base layer. In other related embodiments, the invention also provides such combined synthetic and natural turf (a layer of growth substrate being arranged, or not being arranged, between the foundation and the base layer) further characterized in that the growth substrate

consists of "infertile leaf mould", a mixture of sand and an organic material, or top layer mixtures applied in natural grass turfs. In additional related embodiments, the invention also provides such combined synthetic and natural turf (a layer of growth substrate consisting of, or not consisting of, "infertile leaf mould", a mixture of sand and an organic material, or top layer mixtures applied in natural grass turfs) further characterized in that the turf is used as sportsfield or as grass turf in gardens, playgrounds, (recreational) parks or golf courses.

Brief Summary Paragraph Type 1 (2):

a plurality of synthetic grass fibers connected at least partially to the fabric, at least one of the ends of each fiber protruding outside the fabric and forming a synthetic grass blade. Such a base layer is known, for instance from WO-A-9400639.

Brief Summary Paragraph Type 1 (4):

b. arranging a layer of growth substrate and grass seeds sown therein over the base layer, in such manner that the synthetic grass blades rise at least partially above the layer of growth substrate,

Brief Summary Paragraph Type 1 (6):

d. mowing the natural grass to a length which is greater than the length of the synthetic grass blades.

Detailed Description Paragraph Right (2):

Synthetic grass fibers 7, preferably in a bundle 8, are co-woven such that the ends 9 and 10, which form grass blades, extend from the fabric at intersections 11 of non-degradable warp and weft threads. At each intersection the blades of for instance two successive bundles 8a and 8b extend outward. In an alternative embodiment of the invention, the threads 5 and 6 can be omitted, whereby apertures are already created immediately in the fabric.

Detailed Description Paragraph Right (3):

FIG. 3 shows a first layer of growth substrate 12 onto which base layer 1 is placed. The foundation or substructure for the whole construction is not shown in detail. In a second layer of growth substrate 13 are sown grass seeds 14, only a few of which are shown for the sake of clarity. In the situation shown, the seeds have just germinated. In FIG. 4 the grass plants 15 are adult and their roots 16 extend into the lower layer of growth substrate. The natural grass blades 17 are longer than synthetic grass blades 18. In FIG. 3 the biodegradable threads 5, 6 are still present. In FIG. 4 they have decomposed or have never been present, thereby resulting in apertures 19.

Detailed Description Paragraph Right (4):

The base layer according to the invention is simple to manufacture and easy to use. The grass surfaces produced therewith moreover have all the advantages of natural grass and synthetic grass, while the most important drawbacks of both are avoided.

Detailed Description Paragraph Right (5):

The base layer according to the invention preferably has a grid pattern. In such a case, the base layer consists of a fabric of a plurality of series of non-degradable weft threads and a plurality of series of biodegradable weft threads alternating with these series, as well as a plurality of series of non-degradable warp threads intersecting the weft threads and a plurality of series of biodegradable warp threads alternating with these series, and the ends of the synthetic grass fibers protrude from the fabric at locations where the series of non-degradable weft threads and non-degradable warp threads intersect. Relatively robust pieces of fabric thus remain at the intersections of the non-degradable weft and warp threads. In the course of time holes will occur at intersections of biodegradable weft and warp threads. The thus resulting coarse-mesh network is held in place by a layer of growth substrate arranged thereon.

Detailed Description Paragraph Right (7):

It is particularly recommended that the artificial grass fibers are monofilament fibers. In contrast to the fibrillated yarns normally used in synthetic grass surfaces, such monofilament fibers look more like grass blades. If desired however, fibrillated yarns or combinations of different types of yarn can also be used in the base layer according to the present invention.

Detailed Description Paragraph Right (8):

Synthetic grass fibers are of course usually green. It is however possible according to the present invention for at least a part of the synthetic grass fibers to have at

least one colour other than green. A pattern, such as the lines of a playing field or a club logo, can hereby be formed in the synthetic grass part of the combined turf. An advertizing message can also be envisaged here. Fibers with a colour other than green will become particularly clear when the playing field is damaged. Coloured fibers can optionally be used at the location of the pattern which are the same length as the natural grass and planted more densely in the foundation. The pattern is thus also visible when the natural grass is intact. Repeated application of new chalk lines for playing field lines in particular is thus avoided.

Detailed Description Paragraph Right (11):

The length of the synthetic grass fibers can be chosen as desired and depends for instance on the distance over which the fiber is co-woven with the fabric and on the thickness of the layer of growth substrate arranged on the base layer as well as on the desired length of the protruding synthetic grass blades.

Detailed Description Paragraph Right (12):

Synthetic grass fibers are per se known. Synthetic grass fibers are made for instance from polyolefins, polyamides or fibers of natural or non-natural material. The materials used are preferably resistant to wear under mechanical load and to UV radiation. Synthetic grass fibers are obtainable for instance under the brand names THOLON.TM., TROFIL.TM. etc.

Detailed Description Paragraph Right (13):

The invention also relates to a combined synthetic and natural turf comprising a foundation, a base layer as described above arranged thereon and a layer of growth substrate in which grass plants grow arranged on the base layer. As discussed above, the thickness of the layer of growth substrate arranged on the base layer is preferably chosen such that synthetic grass blades of the base layer remain protruding thereabove. However, in order to achieve the advantages of natural grass it is recommended that the natural grass blades be longer than the synthetic grass blades. These latter then only appear when the natural grass has wholly or partially disappeared due to use or poor weather conditions. In this way the turf will still retain a green appearance, in any case from a distance. In addition, the fibers give the top layer extra stability and protection, whereby intensity of use can be increased.

Detailed Description Paragraph Right (15):

The foundation can be any foundation used for natural grass or synthetic grass surfaces, such as soil, sand, or a substructure, foundation etc. If desired, shock-absorbing means such as layers of rubber can be applied to a substructure or foundation of for instance concrete. A skilled person in the field of natural and/or synthetic grass surfaces is very well capable, without inventive work, of choosing the foundation suitable for a particular situation. In this application the term "foundation" will be used for any suitable base on which the combined turf according to the invention is used or which forms part of the surface.

Detailed Description Paragraph Right (18):

The synthetic grass fibers can be implanted in the base layer according to the invention at a limited density per unit area because the natural grass forms the larger part of the combination turf. However, greater densities are also possible in determined conditions.

Detailed Description Paragraph Right (19):

The base layer according to the invention can be supplied for instance on a roll and is therefore simple to use. The base layer can be unrolled onto the desired foundation of growth substrate and cut or trimmed to size. No complex installations are required during laying of the turf for insertion of the synthetic grass blades, because the base layer is prefabricated and already contains the synthetic grass blades.

Detailed Description Paragraph Right (20):

Manufacture of the base layer can also take place in simple manner on a weaving machine. Co-weaving of the synthetic grass fibers is carried out by gripper machines, bar looms or twin looms. Such techniques are generally known.

Detailed Description Paragraph Type 1 (2):

b. arranging a layer of growth substrate and grass seeds sown therein over the base layer, in such manner that the synthetic grass blades rise at least partially above the layer of growth substrate,

Detailed Description Paragraph Type 1 (4):

d. mowing the natural grass to a length which is preferably greater than the length of the synthetic grass blades.

CLAIMS:

1. A combined synthetic and natural turf comprising:

a fabric comprising a grid formed by intersecting warp and weft bands of synthetic fibers, the warp band comprising a plurality of substantially parallel non-biodegradable warp threads and the weft band comprising a plurality of substantially parallel non-biodegradable weft threads;

a plurality of apertures, wherein each aperture comprises an enlarged space between adjacent warp and weft bands; and

a plurality of synthetic grass fibers, wherein at least one end of each fiber is connected to the fabric at a location where the warp and weft bands intersect.

2. The combined synthetic and natural turf of claim 1, wherein said synthetic grass fibers are woven into the fabric.

3. The combined synthetic and natural turf of claim 1, wherein said synthetic grass fibers comprise monofilament fibers.

4. The base layer of claim 1, wherein some of the synthetic grass fibers comprise a color other than green.

5. The base layer of claim 4, wherein said synthetic grass fibers that comprise a color other than green are arranged to form visible lines in the combined turf.

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L5: Entry 5 of 39

File: USPT

Oct 9, 2001

DOCUMENT-IDENTIFIER: US 6299959 B1
TITLE: Filled synthetic grass

Abstract Paragraph Left (1):

The improved top dressed synthetic turf according to the patent invention provides thatch like fibers to retain top dressing and particularly the rubber or resilient particles in the dressing. The grasslike surface is formed by polyethylene co-polymer slit fibers more than two inches in height tufted through a fiberglass reinforced backing. The thatch zone fibers are dense and texturized so that they will contract to only about one inch in height after curing.

Brief Summary Paragraph Right (2):

The present invention relates to an improved synthetic grass surface that is filled with a mixture of sand and resilient particles, or resilient particles alone or in other combinations.

Brief Summary Paragraph Right (9):

The invention herein relates to the provision of a synthetic grass having both surface forming fibers and dense thatch zone forming fibers to add resilience and to lock in rubber granules which are distributed more densely near the base of the fibers. In one embodiment of this arrangement, the covering rubber like particles stabilize the synthetic surface fibers in their upright position and provide resiliency and sand like filling is mixed with the rubber particles in the upper levels to produce a predetermined and controlled surface resiliency. The thatch zone forming fibers prevent the rubberlike resilient particles from migrating or escaping the turf. With this arrangement, it is also necessary to reinforce the backing fabric, into which the grasslike and thatch zone fibers are tufted, with fiberglass. Thus the backing fabric preferably consists of a laminate of a fabric with a fiberglass reinforcing matrix and a polyester fabric. After tufting, the backing is sprayed with an resilient latex type or other carpet adhesive to lock in the tufted fibers. Although the grasslike surface forming fibers can conceivably be made of many olefins such as polypropylene, polyethylene or their co-polymers, the polyethylene co-polymers are generally less abrasive. The top dressing may be the sand/rubber mix described above, may consist solely of resilient particles, or may be a combination of resilient particles and polymer beads or pellets.

Brief Summary Paragraph Right (10):

It is therefore an object of the invention to provide an inexpensive, easily applied synthetic grass to produce a playing field of desired resiliency or firmness.

Brief Summary Paragraph Right (12):

It is yet a further object of the invention to provide a synthetic grass surface which is easier and less expensive to maintain than natural turf.

Brief Summary Paragraph Right (15):

These and other objects of the invention are achieved by providing a playing surface for athletic games comprised of fiberglass reinforced backing fabric, a tufted grasslike polyethylene co-polymer fiber component, a dense tufted nylon 6.6 root zone component, and top filling comprised of rubber granules and optional polymer or sand components wherein composition of the mixture may be adjusted based on the distance from the backing fabric. Additional objects and advantages of the invention will be set forth in part in the following description, or may be obvious from the description or accompanying drawings, or may be learned through practice of the invention.

Detailed Description Paragraph Right (2):

The present invention is concerned with a top dressed or filled synthetic grass.

Accordingly, FIG. 1 shows a side elevation of a preferred synthetic turf according to the present invention and its constituent components. These components include the grasslike surface forming fibers 20 which are in a slit ribbon form when tufted through the composite backing sheet composed of a fabric with a reinforcing fiberglass matrix 31 and standard polypropylene fabric 30, and the thatch like texturized nylon 6.6 fibers 23 which are also tufted through the composite backing sheet 30, 31.

Detailed Description Paragraph Right (4):

The grasslike fibers 20 are tufted to a minimum two inch or 50 mm pile height and are made of polypropylene or polyethylene co-polymer slit film yarn having a denier between about 7600 and 8000. Such fibers are typically between about 0.40 and 0.75 inches wide. Preferably these fibers are tufted to about a 2.5 inch height though heights between 2 and 3 inches will be suitable for various applications. The "thatch zone" yarn is preferably a bundle of at least four strands of texturized nylon 6.6 monofilament ribbon with a denier of between about 350 and 800 and tufted to a minimum length of about two inches finished pile height.

Detailed Description Paragraph Right (8):

It will be understood that various adjustments to the composition and structure of the synthetic grass will be desirable. For instance, taller pile heights of the grasslike fibers 20 permit the placement of more top dressing, which in turn provides more cushioning. The aging of the grasslike fibers 20 is also significant. Over time, the tips 21 will tend to fibrillate which gives a denser appearance to the grasslike surface and may help contain the top dressing, and especially the lighter components of the top dressing. In some circumstances, the tips 21 will be mechanically fibrillated either during or immediately subsequent to installation of the top dressing.

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L5: Entry 33 of 39

File: USPT

Feb 24, 1976

DOCUMENT-IDENTIFIER: US 3940522 A

TITLE: Synthetic fibers and pile fabrics made therefrom

Detailed Description Paragraph Right (10):

The departure of the shape of the cross-section of the fiber from the shape of the orifice is a function of the processing conditions. Using the same orifice, the cross-section will vary depending upon the length of the air gap between the spinnerette and the quench bath, the angle of approach to the surface of the bath, the temperature of the bath, the composition of the bath liquid, the travel through the bath, and so forth. For example, when the air gap was varied from 2 inches to 4 inches and the travel through the bath from 1 inch to 12 inches, the included angle of the grass-like fibers spun from 66 nylon under these conditions using an orifice having an included angle of 135.degree. was found to vary from 153.degree. to 180.degree.. Thus, it is possible to introduce a randomness into the synthetic grass-like fibers to simulate the randomness of natural grass simply by according each fiber emerging from a multiorifice spinnerette slightly different treatment. Cut pile fabrics may be constructed from blends of such grass-like fibers; such fabrics closely simulate natural turf.

Detailed Description Paragraph Right (34):

Both the pile and backing material of the fabrics of this invention are made from materials such as polyamides, polyacrylics, polyesters, and polyolefins which resist weathering and have good mechanical properties. In particular, the pile preferably should have exceptionally good resilience and resistance to light fading and weathering. The fibers preferably should resist tearing, fibrillating and permanently deforming. Polyamides such as nylon 6, nylon 66, nylon 610, nylon 612, and copolymers and blends of these are particularly preferred.

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L5: Entry 38 of 39

File: USPT

Nov 2, 1971

DOCUMENT-IDENTIFIER: US 3617413 A
TITLE: PRODUCTION OF SIMULATED GRASSLIKE PRODUCTS

Detailed Description Paragraph Right (5):

The number of blades comprising split ribbons, and the width variation of the split ribbon parts, as well as the average length of the splits will, of course, be determined by the number and location of slitting blades to which the ribbon is subjected. As there are many species of natural grass, it may be desired to match the slitting operation experimentally with the natural grass desirably simulated. In general, the discontinuous slits will be at least 0.25 inch long but will not exceed the length of a full loop in the finished product or twice the length of a blade of the synthetic grass. Longitudinal intervals of about 1.50 inches between slits will normally provide a relatively high ratio of length of unslit ribbon to that of slit ribbon.

Detailed Description Paragraph Right (22):

After applying and curing the latex, the turf is dimensionally stable and may be employed as a useful product without further treatment. However, it has been found that the wear properties of the turf are enhanced if a resilient foam backing is applied before use. For outdoor applications, a PVC (polyvinylchloride) closed cell foam or solid PVC is preferred because of its excellent strength and well known weather resistant properties. An open cell PVC foam is suitable for indoor uses, but generally is not desirable for indoor installation because of its propensity to absorb large amounts of moisture. However, if the turf is going to be used indoors, other elastomers such as latex foam and polyurethane also may be used with good results.

Detailed Description Paragraph Right (23):

The foam may be applied by any of the conventional techniques which are well known in the art. Either mechanical, physical or chemical foaming may be employed, and the foam sheet may be either cast and cured directly on the back of the turf, or cast separately and cemented in place. The foam may be any thickness and density desired, but generally a PVC foam between 1/8 and 3/8 inch thick and having a density of 15 to 55 pounds per cubic foot is preferred. A polyurethane foam of a similar thickness having a density of 1.0 to 4.0 pounds per cubic foot and reinforced with an embedded nylon scrim is also satisfactory. It is noted, however, that for a preferred embodiment of this invention, a PVC plastisol containing a foam stabilizer is frothed with latex foaming equipment and cast directly upon the turf to form an open cell foam having a thickness of 1/4-inch and a density of about 35 pounds per cubic foot.

Detailed Description Paragraph Right (27):

FIG. 7 shows a cross section of the turf generally enlarged to illustrate the preferred construction thereof. The pile 9 is formed from pigmented continuous monofilament ribbon having a substantially rectangular cross-sectional configuration as shown in FIG. 5. The pile is embedded in a woven synthetic fiber backing 10 and anchored securely therein by bonding agent 11. A polyvinyl chloride foam 12 has been applied on the backing to improve the physical properties of the turf.

Detailed Description Paragraph Right (30):

A 3-ply yarn composed of these polypropylene monofilaments was tufted into a nylon scrim reinforced polyurethane foam tufting medium and was sheared to 1/4-inch pile height with 18 ounces of polypropylene face yarn per square yard of fabric. A latex adhesive was applied to the underside of a portion of the fabric and a nonwoven rayon-polyolefin scrim was applied to the adhesive to form a secondary backing.

Detailed Description Paragraph Right (31):

Analogously to the procedure described in example 1, the same type of pigment

composition and extrusion system was used in conjunction with a rotary slitter to produce slitted grass-green polyethylene terephthalate ribbon monofilaments 0.045-inch wide by 0.0015-inch thick. The polyester polymer was supplied by the Chemical Division of Goodyear Tire and Rubber Company, and was designated VFR 1301-A. Five ply yarn of the polyester filaments was tufted into a nylon scrim reinforced polyurethane foam tufting medium, and the tufts were cut to 1/2-inch pile height to provide 28 ounces of polyester per square yard of fabric. A very thin layer of adhesive latex was applied to the underside to bond the fabric to a pad of foamed PVC 1/4-inch thick. The resultant composite had the appearance and plushness of a well-cultivated natural grass plot.

Detailed Description Paragraph Right (34):

An open cell PVC foam having a thickness of 1/4-inch and a density of 35 pounds per cubic foot was then cast upon the backing of the turf using conventional techniques to form a resilient pad.

Detailed Description Paragraph Right (35):

A synthetic turf was produced according to the procedure of example III except the ribbons were polyethylene terephthalate monofilament ribbons 0.002 -inch thick and 0.04 -inch thick.

Detailed Description Paragraph Right (36):

Example III was repeated except the nylon 66 monofilament ribbons had serrated cross sections and the backing was prepared from polyethylene terephthalate staple fibers.

Detailed Description Paragraph Right (38):

A synthetic nylon turf was produced according to the procedure of example III except the PVC foam backing was not applied. Evaluation of the turf showed some shedding and matting of the nylon pile when subjected to heavy foot traffic, but the product was considered satisfactory for light service applications.

WEST**End of Result Set**

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L5: Entry 39 of 39

File: USPT

May 11, 1971

DOCUMENT-IDENTIFIER: US 3578333 A

TITLE: PRACTICE GOLF GREEN INCLUDING UNDULATED AREA AND THICKENED TAPERED CUP RECEIVING
END PORTIONBrief Summary Paragraph Right (1):

The art provides a wide variety of golf games adapted for play indoors with synthetic grass or plastic mats and various forms of ramps, signals and ball-return mechanisms associated with the cup. A difficulty with this kind of game is that the conditions of play do not approach actual conditions on the golf course and use of the game, though amusing and entertaining, does not contribute to the golfing proficiency of the player. Furthermore, the scoring of the games are related to chance rather than the accuracy of the shot and no means are provided to determine or measure the true difference between the poor, average and good golf shot. Also, the player has no means to measure or evaluate the consistency of his swing or the improvements in his golf game with continued practice. Aside from direction, practice on the parlor rug gives the serious golfer little practice or opportunity to increase his proficiency for actual play.

Detailed Description Paragraph Right (11):

The mat 10 and the green 30 can be constructed of any strong, flexible synthetic or natural material which is fire resistant and resistant to cutting, tearing, cracking and abrasion. These parts can be made of rubber, rubber coated fabric or a wide variety of synthetic plastics such as polyvinyl, particularly polyvinyl, sisal and cork compositions, polyethylene, polybutylene, polystyrene, nylon, polyurethane and polymeric isocyanates, that is those plastics which are readily formed into pliable sheets or laminates of the desired thickness. A number of organic or inorganic fillers can be used, as well as fabrics coated or laminated with plastics. Materials having a high strength-to-weight ratio, light weight and low water or no water absorption are preferred. Limited amounts of foaming or cellular structure can be incorporated during fabrication to give lightness of weight, good flexibility and sufficient softness to simulate on actual golf green.